



PlantScape Controller Implementation

Lesson 2

Understanding the Temperature Control SCM

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Notes

Introduction

The purpose of this Lesson is to give you knowledge of Sequential Control Modules. Upon completion of this Lesson you will have imported a Temperature Control SCM from a master database. You will have studied the code, loaded the SCM, and activated it.

Objectives

- ❶ Understand Control Builder Import\Export Functions
- ❷ Import a Temperature Control SCM
- ❸ Examine and understand the SCM code
- ❹ Load and Activate the SCM



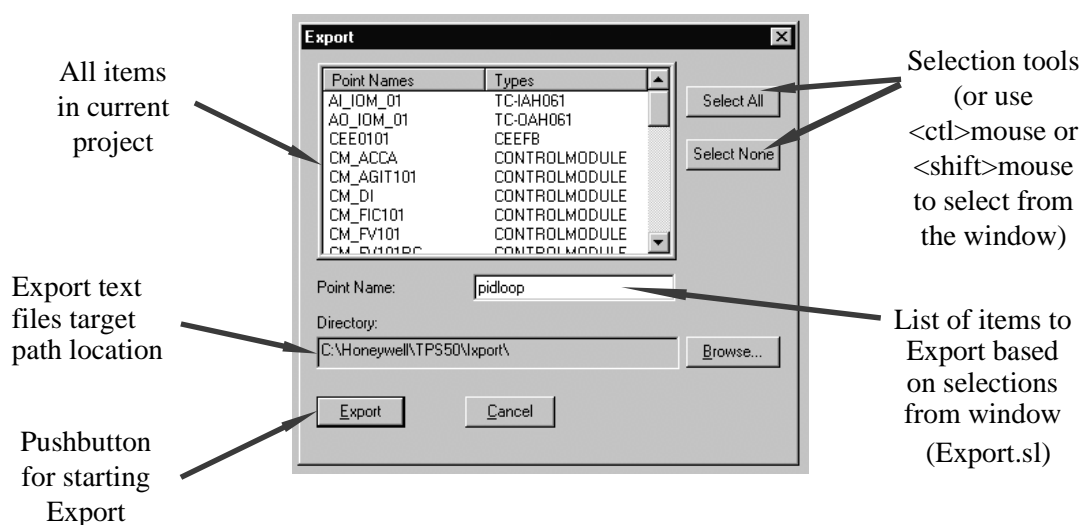
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Notes

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Export

- In Control Builder, select **File** → **Export** to call up the dialog box shown:



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Notes

Export

The Export function copies designated Control Builder Project items to the directory shown in the Export dialog box. The items are converted into text files, one file for each function block along with other files used by the Import\Export function. Note: these files **cannot** be used for configuring similar objects using a text editor.

An additional file, Export.sl, is created. It is a selection list which contains the tag names of the items chosen to Export.

The default file location for the Export is Honeywell\tps50\Iexport



Export ...continued

To perform an Export:

- Scroll down in the Project window and find the object(s) you wish to Export to another Project file
- Select the object(s) to cause it to appear in the **Point Name** port
- Select the **Export** pushbutton to cause the object(s) to be put into text file format in the target path location.
- You can locate the resulting files in windows Explorer. There is a file for each Function Block as well as a file for the overall configuration. Also, there is a .bcd file used internally by PlantScape, and a Selection List called Export.sl. The text files are very small. (Your entire class project would fit on a single floppy in Export format.)
- We will now examine the Import Function

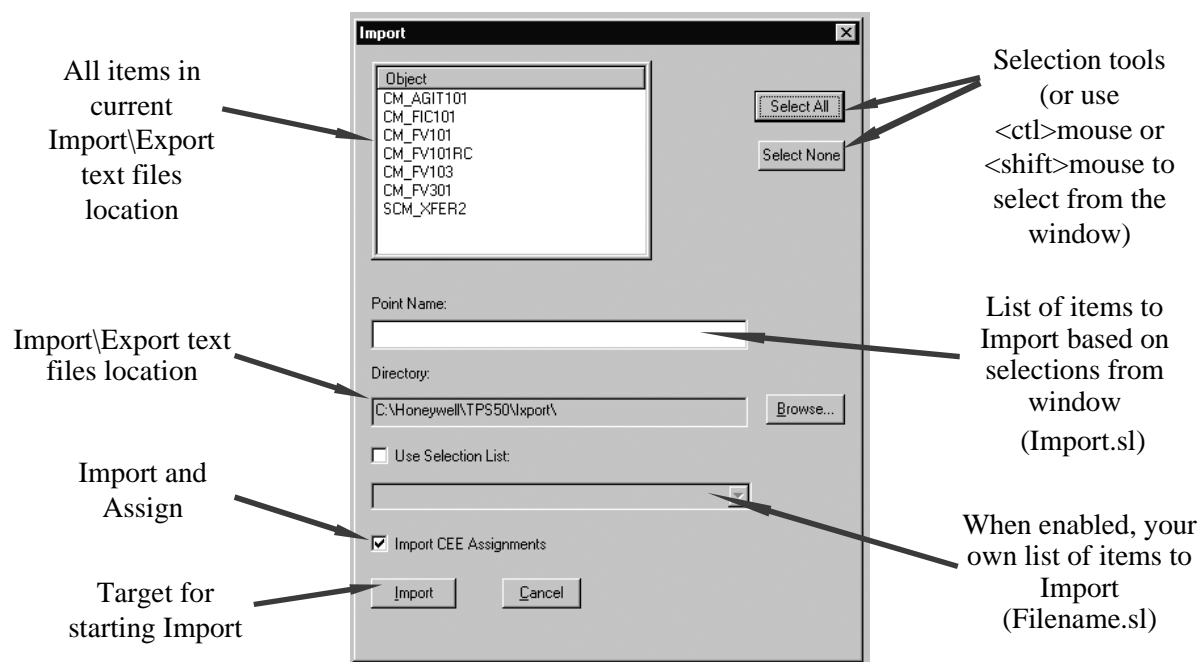
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Notes

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Import

In Control Builder, select **File** → **Import** to call up the dialog box shown:



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Notes

Import

The Import function copies designated items from the Import\Export text files, located in the directory shown in the Import form, to the Control Builder Project.

The items to be Imported are listed in a file called a selection list. If items are selected from the Import form window, the list created is called Import.sl. You can use notepad to create your own selection list as well. To use this type of list, copy your .sl file to the same directory that contains the item text files, check the Use Selection List check box, and browse to the list file. The items contained in the list will appear in the Point Names port.

If the items were assigned in the source project file, and the same controller name exists in the target project file, assignment to the controller can be done at Import. If this is not desired, do not check the Import CEE Assignments check box. The Imported Items will then appear under the project root.



Import ...continued

To perform an Import:

- Select the **Browse...** pushbutton and find the object(s) you wish to Import to your Project
- Select the object(s) to cause it to appear in the **Point Name** port
- Uncheck the **Import CEE Assignment** check box if you want to assign the object after it is added to Project
- Select the **Import** target
- The object will now be in your project under the Root, since Assignment was not Imported
- The object can now be modified, assigned, and loaded to a controller
- We will now Import an SCM to our Project root

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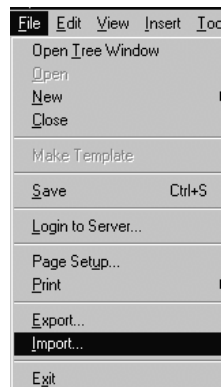
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Importing Sequential Control Modules

➤ Open the Import Tool

- Open Control Builder, if not already open
- Click **File** → **Import** to call up the Import Dialog box shown on the next page



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Notes

Overview

Sequential Control Modules (SCM) are made up of Handlers. Handlers are made up of Transitions, and Steps that, when combined, form a procedural process. The actions (Steps) execute expressions (Outputs) in an SCM based on conditions (Transitions) being met. One Step cannot occur until a previous Step has been completed and the next Transition condition is met. SCMs perform their processes by monitoring and controlling previously configured CMs.

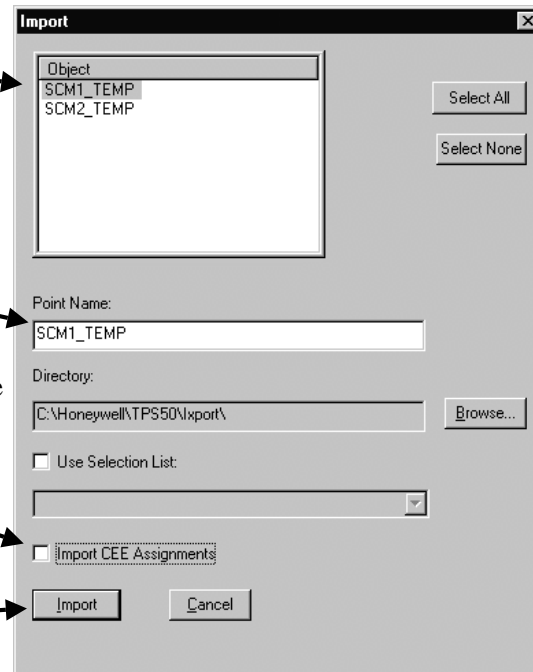


Refer to the *Control Builder Components Theory* for a detailed explanation of the differences and interfaces between Control Modules and Sequential Control Modules.



➤ **Importing a Sequential Control Module ... continued**

- In the Object window, select the appropriate SCM to Import*
Team1: **SCM1_TEMP**
Team2: **SCM2_TEMP**
- Note that your choice appears in the Point Name Window
- Uncheck Import CEE Assignments so that the SCM will be imported under the Project root
- Click the Import button to add the SCM to your Project



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Notes

Importing SCMs

The reason that the two SCMs appear in the Object window is because they were Exported from a master erdb to your **C:\Honeywell\TPS50\Iexport** directory prior to class.

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➤ Importing a Sequential Control Module ... continued

- As the Import progresses, status is shown in the Importing Data dialog box which appears after the Import button is selected.
 - The Status bar indicates Import function progress
 - If errors are encountered, they display as they occur in the Errors window
 - At Import completion, the Status of the Import is shown in the top window. In this example, there were many errors, but they were NonFatal meaning the Import took place. **You should get no errors.**

- Click Close

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Notes

Importing SCMs -- Errors

Import errors can be numerous when importing SCMs. If the CMs referenced by the SCM being imported do not already exist in Project, every reference to a non-existent CM will create an Import error. That is what happened in the above example -- referenced CMs had not yet been added to Project.

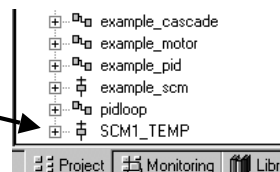
These errors are nonfatal, meaning the Import still takes place, but the errors must be corrected prior to operation or the SCM will fail.

You should have all referenced CMs in Project at this time and you should get no errors. **See your Course manager if you do get errors.**



➤ Examining a Sequential Control Module

- The SCM should now appear in the Project under the root.
- Open the SCM and study the code. Compare it to the process description in the notes below. Click the top line of each Transition and Step to alternate between Description and Code Syntax.
- Double click on Steps and Transitions to view configuration detail. Note the Primary and Secondary Gate configuration in Transitions.
- Open the SCM and study the code. Compare it to the process description in the notes below. Click the top line of each Transition and Step to alternate between Description and Code Syntax.
- See your Course manger for any clarification you may need. When you understand the code of the SCM go to the next page. We will assign,load and activate the SC.



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Notes

Temperature Process Description

This SCM will operate the CM#_TIC101 CM to heat and cool the Reactor as follows:

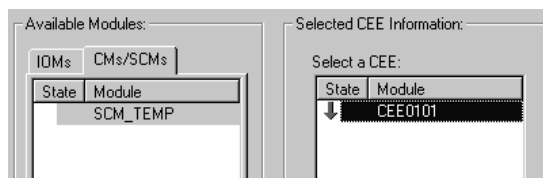
1. Change CM#_TIC101 & CM#_FIC101 Mode Attributes to Program, Modes to Auto and Cascade.
2. Verify Mode settings
3. Change CM#_TIC101 SP to 80.0 Degrees.
4. Wait until CM#_TIC101 PV is within 2 Degrees of SP.
5. Change CM#_TIC101 SP to 35.0 Degrees
6. Change CM#_TIC101 Mode Attribute to Operator
7. Wait until CM#_TIC101 PV is within 3 Degrees of SP.

CM#_FLAGS.TEMP is the automatic start for this SCM.

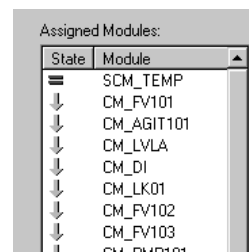
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➤ Assigning SCMs to the CEE

- From the Control Builder **Tools** menu, click **Assign** to display the Controller Assignments



- Locate the Available Modules section on the left side of the window and click **SCM #_TEMP** in the tab labeled **CMs/SCMs**
- Select the destination CEE (CEE0101)
- Click **Assign** in the center of the window and note that your SCM appears in the **Assigned Modules** window after a few seconds
- Click **Close**



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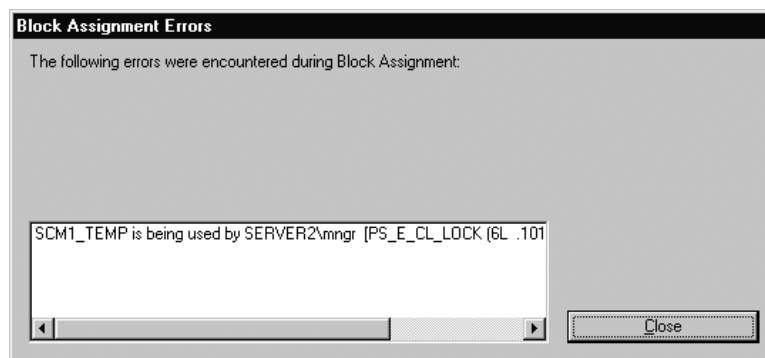
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Assigning SCMs to the CEE

Before you can load your SCM it must be assigned to a CEE.

Please note the following:

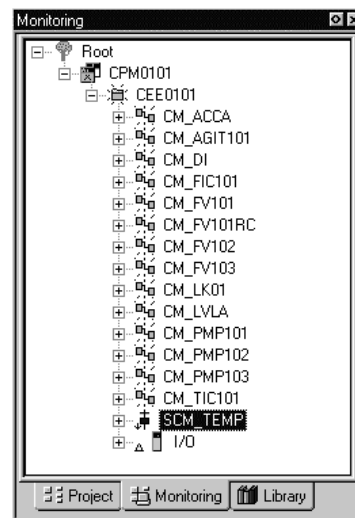
- If you get the Block Assignment Error shown, close the SCM in the edit window and try again. A CM, IOM or SCM cannot be assigned if it is open for editing.





➤ Loading and Activating the SCM

- Open the **Project** Tab in Control Builder
- Select the **SCM#_TEMP**
- Click the **Tools** Menu
- Click **Load**
- Click **Continue** to continue
- Click **Monitoring** to go to the Monitoring (loaded) tab
- Right click on the **SCM** and select **Activate**
- In **Station**, add **SCM#_TEMP** to **Group #2, Slot 5**



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Notes

Loading the SCM

Upon selecting “Load,” a message box will appear, which will tell you exactly what will happen. This command causes the objects to be loaded to your controller and also loads the objects to the PlantScape Server.

Once you select “Continue,” the load begins. If there are any errors, a message box will appear to give you details of the problem(s).

Once the load is complete, all of the loaded objects appear in the Monitoring Tab.

SCMs, like all objects in the Monitoring tab can be many colors. Each color represents a different status. When an object is:

- **green**, the object is running or active
- **blue**, the object is not running, or inactive
- **red**, the object in the Monitoring Database differs from its counterpart in the C200.

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This completes....

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